

Serial No.: 09/480,688

Attorney Docket No: MCS-117-99

IN THE CLAIMS

Please add new claims 32-38 as follows:

Please amend claims 1, 17, 23 and 28 as follows:

1. (Currently Amended) A method of simulating connection characteristics of a network, comprising:

providing a driver capable of accessing a stream of network packets;

calculating a send time for each of the network packets and attaching the respective send time to the corresponding packet;

sequencing the network packets in a queue until the respective send times to simulate a desired propagation connection characteristic;

deleting the send time from each network packet when the packet is removed from the queue; and

altering the stream of network packets to simulate an additional connection characteristic of the network.

2. (Original) The method of claim 1, wherein the propagation connection characteristic is at least one of: (a) bandwidth; (b) transmission delay.

3. (Original) The method of claim 2, wherein the additional connection characteristic of the network is at least one of: (a) loss of a network packet; (b) fragmentation of a network packet; (c) reordering of at least two network packets; (d) duplication of a network packet; (e) network address translation of a network packet having an original network address.

4. (Original) The method of claim 2, wherein simulating a desired bandwidth comprises:

determining a length of a network packet;

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calculating the send time for the network packet using the network packet length to simulate the desired bandwidth.

5. (Original) The method of claim 2, wherein simulating a desired transmission delay comprises adding the desired transmission delay to the send time.

6. (Original) The method of claim 3, wherein altering the stream of network packets to simulate the network address translation of the network packet comprises:  
generating a simulated network address for each new connection; and  
mapping the original network address to the simulated network address for each network packet.

7. (Original) The method of claim 6, wherein the simulated network address is generated randomly.

a 8. (Original) The method of claim 3, wherein altering the stream of network packets to simulate the loss of a network packet comprises:  
determining a packet dropping frequency; and  
deleting the network packet at the packet dropping frequency.

9. (Original) The method of claim 3, wherein altering the stream of network packets to simulate the fragmentation of the network packet comprises:  
determining a packet fragmentation frequency;  
separating the network packet into a plurality of new network packets at the packet fragmentation frequency;  
dividing data contained in the network packet; and  
distributed the divided data between the new network packets.

10. (Original) The method of claim 9, further comprising creating headers for the new network packets.

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11. (Original) The method of claim 9, wherein the divided data is distributed disproportionately between the new network packets.

12. (Original) The method of claim 3, wherein altering the stream of network packets to simulate the reordering of at least two network packet comprises:  
determining a packet reordering frequency; and  
changing an order of the at least two network packets within the network packet stream at the packet reordering frequency.

13. (Original) The method of claim 3, wherein altering the stream of network packets to simulate the duplication of the network packet comprises:  
determining a packet duplication frequency; and  
generating a copy of the network packet at the packet duplication frequency.

ai 14. (Original) The method of claim 2, wherein altering the stream of network packets comprises changing a network address of each client connection.

15. (Original) The method of claim 1, wherein the driver is implemented in an intermediate layer between an upper layer and a lower layer.

16. (Original) The method of claim 15, wherein the upper layer processes the network packets and the lower layer places the network packets onto a physical media of the network.

17. (Currently Amended) A method of altering a network packet having an original network address, comprising:  
providing a driver capable of accessing a stream of network packets;  
mapping the original network address to a randomly-generated simulated network address to create an address-modified network packet; and  
modifying an additional connection characteristic of the stream of network

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packets.

18. (Original) The method of claim 17, wherein the mapping is performed using a two-way mapping table.

19. (Original) The method of claim 18, wherein the two-way mapping table is a two-way hash table.

20. (Original) The method of claim 19, wherein the mapping uses a two-way output hash table, a two-way input hash table and a hash information repository.

21. (Original) The method of claim 18, wherein the mapping uses a two-way output mapping table if the network packet is being transmitted and a two-way input mapping table if the network packet is being received.

22. (Original) The method of claim 17, wherein the additional connection characteristic is at least one of: (a) packet loss; (b) packet fragmentation; (c) packet reordering; (d) packet duplication; (e) bandwidth limitation; (f) transmission delay.

23. (Currently Amended) A network simulation system, comprising:  
a modification module capable of accessing a network packet, comprising:  
an addressing module that replaces an original network address of a network packet with a randomly-generated simulated network address; and  
a propagation module that alters a propagation connection characteristic of the network packet.

24. (Original) The network simulation system of claim 23, wherein the propagation connection characteristic is at least one of: (a) bandwidth; (b) transmission delay.

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25. (Original) The network simulation system of claim 23, wherein the addressing module further comprises a two-way mapping table that maps the original network address to the simulated network address.

26. (Original) The network simulation system of claim 23, wherein the modification module further comprises a sequence module that alters a second connection characteristic of the network packet.

27. (Original) The network simulation system of claim 26, wherein the second connection characteristic is at least one of: (a) packet dropping; (b) packet fragmentation; (c) packet duplication; (d) packet reordering.

28. (Currently Amended) The network simulation system of claim 27 31, wherein the ~~packet~~ queue module includes an input queue that stores the network packet if the packet is being received and an output queue that stores the network packet if the packet is being transmitted.

29. (Original) The network simulation system of claim 23, further comprising a transmission module that removes the network packet from the queue module at a specified time.

30. (Original) The network simulation system of claim 29, wherein the specified time is a send time that is determined by the propagation module.

31. (Original) The network simulation system of claim 23, further comprising a queue module that stores the network packet for a period of time.

32. (New) The method of claim 1, wherein attaching the respective send time to the corresponding packet further comprises attaching a header containing the send time to the packet.

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33. (New) The method of claim 32, wherein deleting the send time from each network packet further comprises removing the header containing the send time from the packet.

34. (New) A method of simulating connection characteristics of a network, comprising:

- providing a driver capable of accessing a stream of network packets;
- calculating a send time for each of the network packets;
- sequencing the network packets in a queue until the respective send times to simulate a desired propagation connection characteristic; and
- altering the stream of network packets to simulate a network address translation of the network packet by randomly generating a simulated network address for each new connection and mapping the original network address to the simulated network address for each network packet;

wherein the propagation connection characteristic is at least one of: (a) bandwidth; (b) transmission delay;

wherein the additional connection characteristic of the network is at least one of: (a) loss of a network packet; (b) fragmentation of a network packet; (c) reordering of at least two network packets; (d) duplication of a network packet.

35. (New) A method for altering a network packet to simulate a new connection on a computer network having a server, comprising:

- capturing a network packet having an original network address from a packet stream;
- randomly generating a simulated network address to simulate the new connection; and
- mapping the network packet to the new connection such that the original network address is replaced with the simulated network address to make it appear to the server that the network packet is being transmitted from the new connection at the simulated network address.

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36. (New) A method of simulating connection characteristics of a network, comprising:

- providing a driver capable of accessing a stream of network packets;
- calculating a send time for each of the network packets;
- sequencing the network packets in a queue until the respective send times to simulate a desired propagation connection characteristic; and
- altering the stream of network packets to simulate duplication of the network packet by determining a packet duplication frequency and generating a copy of the network packet at the packet duplication frequency;

wherein the propagation connection characteristic is at least one of: (a) bandwidth; (b) transmission delay.

wherein the additional connection characteristic of the network is at least one of: (a) loss of a network packet; (b) fragmentation of a network packet; (c) reordering of at least two network packets; (d) network address translation of a network packet having an original network address.

37. (New) A method of simulating duplication of network packets on a computer network, comprising:

- obtaining a network packet from a packet stream;
- determining a desired packet duplication frequency;
- generating a copy of the network packet at the packet duplication frequency; and
- transmitting the network packet and the copy of the network packet on the computer network.

38. (New) The method of claim 37, wherein the packet duplication frequency is randomly determined.

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